

Identification of ^{109}Mo and Possible Octupole Correlations in $^{107,109}\text{Mo}$

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The measurement consisted of a $\gamma - \gamma - \gamma$ coincidence study of the spontaneous fission of ^{252}Cf with 72 Compton suppressed Ge detectors in Gammasphere. The data were taken by the GANDS95 collaboration [1] and were analyzed mainly by Vanderbilt University members of the collaboration.

The Mo nuclei with $N = 65-67$ are the best candidates for the observation of parity doublets related to static octupole deformation. The Ba and Mo nuclei produced in the spontaneous fission of ^{252}Cf are partners and the Ba nuclei have static octupole deformed shapes. The ^{107}Mo level scheme is very different from those of the other lighter odd-A Mo nuclei, and the structure of the low-lying levels of this nucleus is not obvious.

In this work we have investigated the band structure of ^{107}Mo in search for evidence of octupole deformation. We have identified ten new transitions in ^{107}Mo which are shown to be connected by the intertwined $E1$ transitions. These new band structures are interpreted as the parity doublets related to static deformation.

Also, we have identified for the first time nine γ -ray transitions in ^{109}Mo . The level scheme of ^{109}Mo is similar to that of ^{107}Mo but with only one intertwined band observed. From these data we suggest that the $^{107,109}\text{Mo}$ have static octupole deformations. This is the first evidence for octupole deformation related to only one type of nucleons, and in particular to the

$\nu d_{5/2} - \nu h_{11/2}$ orbitals in the $N = 65-67$ region. The $B(E1)/B(E2)$ branching ratios indicate that the octupole correlations are stronger in $N = 67$ than in $N = 65$. More details of this work are given in [2].

References

- [1] For list of authors and institutions see B.R.S. Babu *et al.* Phys. Rev. C54 (1996) 568
- [2] Published in Phys. Rev. C56 (1997) 1344